PAVEMENT AND BRIDGE OVERVIEW

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• Brief overview

• Pavement and Bridge State of the Practice
  • Current trends
  • Performance history
  • Current conditions
  • Challenges
  • Actions and techniques implemented

• Next Steps
PAVEMENT OVERVIEW
State of the Practice
Pavement Inventory (2017)

- VDOT Maintained inventory 128,600 lane miles
  - Interstate – 5,600 lane miles
  - Primary – 22,100 lane miles
  - Secondary – 100,300 lane miles
  - Frontage – 600 lane miles

- Federal Focus - NHS
  - NHS Inventory 18,700 lane miles
    - All Interstates
    - Approx. half of all Primaries
    - Few Secondaries
  - NHS Inventory Maintenance
    - VDOT 15,700 lane miles
    - Locality 3,000 lane miles
Current Trends

State Maintained Lane Miles & Daily Vehicle Miles Traveled

<table>
<thead>
<tr>
<th>Year</th>
<th>Lane Miles</th>
<th>DVMT in millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>125,000</td>
<td>200</td>
</tr>
<tr>
<td>2007</td>
<td>126,000</td>
<td>205</td>
</tr>
<tr>
<td>2008</td>
<td>127,000</td>
<td>210</td>
</tr>
<tr>
<td>2009</td>
<td>128,000</td>
<td>215</td>
</tr>
<tr>
<td>2010</td>
<td>129,000</td>
<td>220</td>
</tr>
<tr>
<td>2011</td>
<td>130,000</td>
<td>225</td>
</tr>
<tr>
<td>2012</td>
<td>131,000</td>
<td>230</td>
</tr>
<tr>
<td>2013</td>
<td>132,000</td>
<td>235</td>
</tr>
<tr>
<td>2014</td>
<td>133,000</td>
<td>240</td>
</tr>
<tr>
<td>2015</td>
<td>134,000</td>
<td>245</td>
</tr>
<tr>
<td>2016</td>
<td>135,000</td>
<td>250</td>
</tr>
</tbody>
</table>

Virginia Department of Transportation
Current Trends

Truck Loads

• Trucks are getting heavier and the inventory is aging
  • Many pavements and bridges were designed for 80,000 lbs. or less
  • 91,000 lb. legal loads have been proposed
Pavement Structure
Typical Full-Depth Asphalt

- **Surface Layer**
  - Asphalt
  - 1-1/2” – 2”
- **Intermediate Layer**
  - 2” – 4”
- **Base Layer**
  - 6” – 8”
- **Subbase Layer**
  - 18” – 24”
- **Subgrade**
  - Existing Soil

**Asphalt Layers**

Virginia Department of Transportation
Pavement Structure Stress Distribution

Pavement in good condition: Proper stress distribution through different layers

Pavement in poor condition: Significant stress damaging bottom layers

- Highest stress @ top layer
- Stress reduced
- Further reduction in stress
- Substantial reduction in stress

- Highest stress @ top layer
- Stress does not reduce but transferred to lower layer
- Stress does not reduce significantly and transferred to lower layers
- Substantial stress on soil & subgrade

Virginia Department of Transportation
Pavement Treatment - Overlay

Typical Service Life
Treatment Categories and Relative Costs

Approx. Unit Cost, per lane mile – Interstate
- Preventive - $45K
- Corrective - $180K
- Restorative – $340K
- Reconstruction – $1M
## Pavement Treatment - Maintenance Activities

### Preventive

Preserves good pavements in good condition at low costs

<table>
<thead>
<tr>
<th>Surface Layer (covered)</th>
<th>Intermediate Layer</th>
<th>Base Layer</th>
<th>Subbase Layer</th>
<th>Subgrade</th>
</tr>
</thead>
</table>

### Corrective

Addresses moderate distresses

<table>
<thead>
<tr>
<th>Surface Layer (replaced)</th>
<th>Intermediate Layer</th>
<th>Base Layer</th>
<th>Subbase Layer</th>
<th>Subgrade</th>
</tr>
</thead>
</table>

### Restorative

Addresses moderate to heavy distresses

<table>
<thead>
<tr>
<th>Surface Layer (replaced)</th>
<th>Int. Layer (replaced)</th>
<th>Base Layer</th>
<th>Subbase Layer</th>
<th>Subgrade</th>
</tr>
</thead>
</table>

### Reconstruction

Addresses pavements under heavy distresses or in failed condition

<table>
<thead>
<tr>
<th>Surface Layer (replaced)</th>
<th>Int. Layer (replaced)</th>
<th>Base Layer (replaced)</th>
<th>Subbase Layer (replaced)</th>
<th>Subgrade</th>
</tr>
</thead>
</table>
Pavement Treatment Example: Selection, Costs and Service Lives

**Optimal Treatment**
(15 Year Service Life Cost: $330K/lane-mile)

- Restorative Maintenance (e.g. 4” mill and fill) is the appropriate treatment
- Cost: $330 K/ lane-mile
- Expected service life: 15 years
- Actual service life: 15 years

**Sub-optimal Treatment**
(15 Year Service Life Cost: $450K/lane mile)

- Corrective Maintenance (e.g. 1.5” mill and fill)
- Cost: $180 K/ lane-mile
- Expected service life: 10 years
- Actual service life: 6 years
PAVEMENT PERFORMANCE MEASURES
Pavement Performance Measures
VDOT Condition Categories

- Pavement Critical Condition Index (CCI) is calculated on a scale of 0 to 100
- Pavement condition categories:
  - Excellent (≥ 90 CCI)
  - Good (Between 70 and 89 CCI)
  - Fair (Between 60 and 69 CCI)
  - Poor (Between 50 and 59 CCI)
  - Very Poor (≤ 49 CCI)
Pavement Performance Measures
Brief History in VDOT

• In 2007-2008
  • Interstate: >82% fair or better
  • Primary: >82% fair or better

• Considerations in selecting targets (in 2007-2008):
  • Existing pavement condition
  • Available funding
  • Review of other state practices

• In 2011-2012
  • Secondary: >65% fair or better
## Pavement Statewide Performance Measures

<table>
<thead>
<tr>
<th>Performance Measure Description</th>
<th>Current Policy (Percent Sufficient)*</th>
<th>Updated Policy (Percent Sufficient)</th>
<th>Current Performance 2016 (rounded) (Percent Sufficient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>82% No Section CCI less than 30</td>
<td>82% No Section CCI less than 35</td>
<td>90%</td>
</tr>
<tr>
<td>Primary</td>
<td>82%</td>
<td>82%</td>
<td>84%</td>
</tr>
<tr>
<td>Secondary</td>
<td>65%</td>
<td>65%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Current funding sustains interstate and primary condition
Additional funding required to achieve secondary target

*Sufficient means “Fair” or better

**NOTE:** Objective is to **sustain or improve** current performance on the interstate and primary and achieve target on the secondary.
# Texas (Performance Measures & Targets)

<table>
<thead>
<tr>
<th>Performance Target</th>
<th>Statewide Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>90% in good or better condition. * Good &gt;=70 On a 0-100 scale</td>
<td></td>
</tr>
<tr>
<td>Interstate</td>
<td>87.9%</td>
</tr>
<tr>
<td>US Highways</td>
<td>88.2%</td>
</tr>
<tr>
<td>State Highways</td>
<td>86.7%</td>
</tr>
<tr>
<td>Farm to Market Highways</td>
<td>87.4%</td>
</tr>
</tbody>
</table>

- VDOT performance measures are set based on “Fair” or better (i.e. CCI > 60)
- Texas “Good” is roughly equivalent to or slightly better than Virginia “Fair”
## North Carolina (Performance Measures & Targets)

<table>
<thead>
<tr>
<th>System</th>
<th>Performance Target (Good or Better)</th>
<th>Statewide Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>86%</td>
<td>90%</td>
</tr>
<tr>
<td>Primary</td>
<td>80%</td>
<td>71%</td>
</tr>
<tr>
<td>Secondary</td>
<td>75%</td>
<td>81%</td>
</tr>
</tbody>
</table>

* Good => 80 on a scale of 0-100

- VDOT performance measures are set based on “Fair” or better (i.e. CCI > 60)
- North Carolina “Good” is better than Virginia “Fair”
## Georgia (Performance Measures and Targets)

<table>
<thead>
<tr>
<th>System</th>
<th>Performance Target (Fair or Better)</th>
<th>Statewide Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>90%</td>
<td>74%</td>
</tr>
<tr>
<td>Primary</td>
<td>90%</td>
<td>71%</td>
</tr>
</tbody>
</table>

* Fair => 70 on a scale of 0-100

- VDOT performance measures are set based on “Fair” or better (i.e. CCI > 60)
- Georgia “Fair” is roughly equivalent to or slightly better than Virginia “Fair”
VDOT Pavement Performance History
% Sufficient – Interstate

<table>
<thead>
<tr>
<th>Year</th>
<th>Interstate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>79.9%</td>
</tr>
<tr>
<td>2010</td>
<td>78.4%</td>
</tr>
<tr>
<td>2011</td>
<td>80.3%</td>
</tr>
<tr>
<td>2012</td>
<td>82.9%</td>
</tr>
<tr>
<td>2013</td>
<td>84.0%</td>
</tr>
<tr>
<td>2014</td>
<td>84.5%</td>
</tr>
<tr>
<td>2015</td>
<td>88.0%</td>
</tr>
<tr>
<td>2016</td>
<td>89.8%</td>
</tr>
<tr>
<td>2017</td>
<td>89.5%</td>
</tr>
</tbody>
</table>

Statewide Target > 82%
One time investment over $300M
VDOT Pavement Performance History
% Sufficient – Primary

<table>
<thead>
<tr>
<th>Year</th>
<th>% Sufficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>75.7%</td>
</tr>
<tr>
<td>2010</td>
<td>73.3%</td>
</tr>
<tr>
<td>2011</td>
<td>77.6%</td>
</tr>
<tr>
<td>2012</td>
<td>81.2%</td>
</tr>
<tr>
<td>2013</td>
<td>83.3%</td>
</tr>
<tr>
<td>2014</td>
<td>82.8%</td>
</tr>
<tr>
<td>2015</td>
<td>81.2%</td>
</tr>
<tr>
<td>2016</td>
<td>83.9%</td>
</tr>
<tr>
<td>2017</td>
<td>84.7%</td>
</tr>
</tbody>
</table>

Statewide Target > 82%
VDOT Pavement Performance History
% Sufficient – Secondary

<table>
<thead>
<tr>
<th>Year</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>68.9%</td>
</tr>
<tr>
<td>2010</td>
<td>65.8%</td>
</tr>
<tr>
<td>2011</td>
<td>64.2%</td>
</tr>
<tr>
<td>2012</td>
<td>60.7%</td>
</tr>
<tr>
<td>2013</td>
<td>59.6%</td>
</tr>
<tr>
<td>2014</td>
<td>60.5%</td>
</tr>
<tr>
<td>2015</td>
<td>59.9%</td>
</tr>
<tr>
<td>2016</td>
<td>60.2%</td>
</tr>
<tr>
<td>2017</td>
<td>60.3%</td>
</tr>
</tbody>
</table>

Statewide Target > 65%
Pavement Maintenance
Current Practice

80% – 90% of the work focused on top 2 layers

10% - 20% of work focused on restorative

Surface Layer (1.5” – 2”)
Intermediate Layer (2” – 4”)
Base Layer (6” – 8”)
Subbase Layer (18” – 24”)
Subgrade (Existing Soil)
Pavement Challenges

- Aging Infrastructure - majority past the design life
- Factors Increasing:
  - Inventory lane-miles
  - Vehicle Miles Traveled (VMT)
  - Truck loading
  - Reconstruction needs
- VDOT continues to maintain the pavement network – current strategy primarily limited to replacing surface layers
Implemented Actions and Techniques

• Take advantage of low asphalt prices
• Implement innovative materials and techniques
  • RAP (Recycled Asphalt Products)
  • New recycling techniques
  • High polymer mixes
  • Thin lift asphalt mixes
• Collaborate with industry to reduce costs
• Incentivize high quality and durable work
Importance of Maintenance

Impacts of rough pavements on vehicle operating costs (NCHRP 730, 2016)

<table>
<thead>
<tr>
<th>Federal Report (NCHRP Report 720)</th>
<th>Estimated %Change Due to Very Rough Pavements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Efficiency</td>
<td>Drops 12%</td>
</tr>
<tr>
<td>Tire Wear</td>
<td>Increase 5%</td>
</tr>
<tr>
<td>Repair and Maintenance</td>
<td>Increase 70%</td>
</tr>
<tr>
<td>Total net effect on vehicle operating cost</td>
<td>Increase 22%</td>
</tr>
</tbody>
</table>

Estimated costs for a medium sized car (Oregon Study, 2013)

<table>
<thead>
<tr>
<th>Estimated Cost</th>
<th>On Smooth Roads</th>
<th>On Rough Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oregon Repair</td>
<td>$380</td>
<td>$646</td>
</tr>
<tr>
<td>Oregon Gas</td>
<td>$942</td>
<td>$1,055</td>
</tr>
<tr>
<td>Total</td>
<td>$1,322</td>
<td>$1,701</td>
</tr>
</tbody>
</table>
Importance of Maintenance Attracting Autonomous Vehicles

• Nationwide competition to attract autonomous vehicles
• Autonomous vehicle companies have stated clearly that their primary needs are:
  • Good pavement
  • Good bridges
  • Good striping
### Secondary Pavements

<table>
<thead>
<tr>
<th>Year (CY)</th>
<th>% Sufficiency</th>
<th>Expenditures (in millions)</th>
<th>% of Statewide Secondary Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>30%</td>
<td>21.2</td>
<td>17.7%</td>
</tr>
<tr>
<td>2015</td>
<td>31%</td>
<td>39.3</td>
<td>27.4%</td>
</tr>
<tr>
<td>2016</td>
<td>36%</td>
<td>93.4</td>
<td>51.4%</td>
</tr>
<tr>
<td>2017</td>
<td>38%</td>
<td>102.5</td>
<td>45.6%</td>
</tr>
<tr>
<td>2018 (predicted)</td>
<td>41%</td>
<td>88.1</td>
<td>51.7%</td>
</tr>
<tr>
<td>2019 (predicted)</td>
<td>45%</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

### FY 2019 State of Good Repair Distribution Percentages

<table>
<thead>
<tr>
<th>District</th>
<th>Minimum %</th>
<th>Approved %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culpeper</td>
<td>5.5%</td>
<td>6.39%</td>
</tr>
<tr>
<td>Lynchburg</td>
<td>5.5%</td>
<td>6.39%</td>
</tr>
<tr>
<td><strong>Northern Virginia</strong></td>
<td><strong>5.5%</strong></td>
<td><strong>6.39%</strong></td>
</tr>
</tbody>
</table>
BRIDGE OVERVIEW
State of the Practice
Virginia: 3rd Largest State-Maintained Bridge Inventory

Count of All Virginia Structures by Highway System

- Urban: 1,011
- Interstate: 2,423
- Primary: 5,797
- Secondary: 12,227
- Other: 17,734

21,458 Structures

NHS & NBI 3,724 structures
Other: 17,734 structures

- NBI = Bridges on National Bridge Inventory (>20’)
- NHS = National Highway System

Count of Structures Associated with Federal Performance Measures (NBI Bridges on NHS)

- Urban: 92
- Secondary: 92
- Primary: 1,867
- Interstate: 1,673

3,724 Structures (17% of All Virginia Structures)
**Metal Culverts**
- 9% by Count (1,933)
- 1% by Area
- 6.1% are SD
- 0.1% Posted

**Timber Deck Bridges**
- 12% by Count (2,459)
- 2% by Area
- 12.2% are SD
- 25% Posted

**Concrete Girder Bridges**
- 8% by Count (1,673)
- 23% by Area
- 4.7% are SD
- 0.1% Posted

**Concrete Slab Bridges**
- 19% by Count (3,989)
- 6% by Area
- 2.5% are SD
- 1.5% Posted

**Concrete Culverts**
- 28% by Count (6,036)
- 4% by Area
- 0.2% are SD
- 0% Posted
Current Trends
 Truck Loads

• Majority of existing bridges were designed ≤ 80,000 pounds
• Strengthening required due to federally-mandated special hauling vehicles
• 91,000 pound legal loads have been proposed
• Trucks have severe effects on bridge
BRIDGE PERFORMANCE MEASURES
## Bridge Statewide Performance Measures

<table>
<thead>
<tr>
<th>Performance Measure Description</th>
<th>Current Policy (Percentage Not Structurally Deficient)*</th>
<th>Updated Policy (Percentage Not Structurally Deficient)</th>
<th>Current Performance (VDOT and Localities) (Percentage Not Structurally Deficient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statewide</td>
<td>92%</td>
<td>95.5%</td>
<td>95.4%</td>
</tr>
<tr>
<td>Interstate</td>
<td>97%</td>
<td>99%</td>
<td>98.5%</td>
</tr>
<tr>
<td>Primary</td>
<td>94%</td>
<td>96%</td>
<td>96.4%</td>
</tr>
<tr>
<td>Secondary</td>
<td>89%</td>
<td>94%</td>
<td>94.7%</td>
</tr>
</tbody>
</table>

Updated Performance Goals are Predicted to be Attained with Current Funding by the End of FY18

*Bridges that are not Structurally Deficient are in a “Fair” or “Good” Condition.

**NOTE:** Objective is to **sustain or improve** current performance on the interstate and primary and achieve target on the secondary
Performance Measures
All Systems – Structurally Deficient - Number and Percentage

Statewide Performance SD Target (All Bridges):
- Current: 4.5% (95.5%)
- Prior to 2017: 8% (92%)

2010 – Bridge Crews Join Bridge Division
CTB & SGR Funds, Executive Emphasis on Bridges, Pavements & Performance Reporting

SD % and Number: All Virginia Bridges
Performance Measures
Interstate – Structurally Deficient - Number and Percentage

Statewide SD Performance Target (Interstates):
- Current: 1% (99%)
- Prior to 2017: 3% (97%)
Performance Measures
Primary – Structurally Deficient - Number and Percentage

Statewide SD Performance Target (Primary):
- Current: 4% (96%)
- Prior to 2017: 6% (94%)
Performance Measures
Secondary – Structurally Deficient - Number and Percentage

Statewide SD Performance Target (Secondary):
- Current: 6% (94%)
- Prior to 2017: 11% (89%)
Despite improvement with Structurally Deficient (SD) Bridges, there is a wave of Fair Bridges at risk of becoming SD in the coming years if not addressed in the near term:

- 24% (5,148) of all bridges are “cusp” (on the verge of SD)
  - 211 in urban system
- 78% of interstate bridges are in Fair condition
- 60% of all bridges are in Fair condition
- Average age of Fair Bridges is 57 years

<table>
<thead>
<tr>
<th>Category</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>28</td>
<td>1,898</td>
<td>1,497</td>
</tr>
<tr>
<td>Primary</td>
<td>193</td>
<td>3,916</td>
<td>1,688</td>
</tr>
<tr>
<td>Secondary</td>
<td>590</td>
<td>6,580</td>
<td>5,057</td>
</tr>
<tr>
<td>Urban</td>
<td>86</td>
<td>530</td>
<td>395</td>
</tr>
</tbody>
</table>
10,435 Structures (~49% of the Inventory) has Exceeded its Anticipated 50 Year Service Life

In 10 Years ~ 64% of the Inventory Will Have Exceeded its Anticipated 50 Year Service Life
Number of Bridges Requiring Replacement Due to Age

Number of Bridges Requiring Replacement per 10 Year Interval if Replaced at Age 70 or at 100 if Built After 2007

Backlog of Older Bridges

Effects of Modern Construction Materials and Design Techniques on New Bridges

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Number of Bridges Requiring Replacement per 10 Year Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 to 2027</td>
<td>6,276</td>
</tr>
<tr>
<td>2028 to 2037</td>
<td>3,710</td>
</tr>
<tr>
<td>2038 to 2047</td>
<td>3,581</td>
</tr>
<tr>
<td>2048 to 2057</td>
<td>2,108</td>
</tr>
<tr>
<td>2058 to 2067</td>
<td>2,324</td>
</tr>
<tr>
<td>2068 to 2077</td>
<td>1,734</td>
</tr>
<tr>
<td>2078 to 2118</td>
<td>349</td>
</tr>
</tbody>
</table>
Implemented Actions and Techniques

- **Proactive Rehabilitation**
  - Nationwide emphasis on preservation
- **Timely Intervention**
- **Maximize Efficiency**
  - New materials
  - New techniques
  - Treatments that provide high Return on Investment (ROI)
Implemented
Actions and Techniques

Bridge Durability – New Construction

Emphasis on Value of Investment
Small Cost Increases Substantially Improving Durability

- 3 Coat Zinc Coatings
- High Performance Concrete
- Corrosion Resistant Reinforcement
- Jointless Bridges
- Low Paste Deck Concrete
- Carbon and Stainless Steel Prestressing Strands

Year Implemented:
- 1984
- 2003
- 2009
- 2011
- 2015
- 2018

Durability of VDOT’s Structure Inventory
Implemented Actions and Techniques
Using Available Funds Effectively
Corrosion Resistant Reinforcement (CRR)

While the material cost of CRR can be as much as 2.5 times normal reinforcement, the additional project cost is minimal (1.4%)

Anticipated Deck Life Extension: 30 to 40 years (up to 80%) for 1.4% cost
Action and Techniques
Joint Elimination with “Flexible” Concrete
The Value of Rehabilitation: I-64 over Shockoe Valley

Prior to Treatment

Prior to Treatment
Rehabilitation: $10M versus Replacement: $140M

I-64 over Shockoe Valley after Rehabilitation 40 Year Life Extension
Safety: Deck Blowouts

With age and deterioration, bridge decks become susceptible to sudden, full depth failure

- Serious economic and life safety implications
- Often unpredictable. Caused by a combination of condition, age, and truck traffic history
- Occurring with greater frequency, particularly on interstates
- Creates an average 7 mile backup on an interstate for 12 - 18 hours (user costs up to $400,000 per event)
Safety: Risks to Motorists Below Bridge

Concrete falling from the bottom of decks creates risk for motorists and pedestrians below

- Maintaining the bottom of a bridge deck is exceedingly costly due to access difficulties
- Distress on the bottom of a deck usually indicates deck replacement is required

Bottom of a Badly Deteriorated Bridge Deck
Safety: Fatigue Cracks – 5,500 Susceptible Bridges

- Heavy, repeated loads lead to fatigue cracks
- Fatigue life can be “reset” with timely action, but after cracks develop remediation costs escalate exponentially
- Problems will continue to worsen with age
Consequences of Load Limitations (Postings) Effecting Virginia’s Competitiveness

• Load-restricted bridges is proportional to the number of SD bridges
• 40% of SD Structures are posted
• Posting interstate bridges impacts Virginia’s economy
• Federally Mandated Special Hauling Vehicles and Emergency Vehicles will require load-posting or strengthening of interstate and primary bridges

• Effects of postings
  • Homeowner’s insurance
  • Access for school buses
  • Emergency vehicles
  • Fire trucks
  • Propane
  • Trash pickup
  • Basic Commercial Deliveries

16 Ton Posting – Caroline County Dead End Road
Real World Effects of Postings: Non-NHS Bridges

14 Ton Posting – Loudon County
Prohibited Garbage Pickup Service

9 Ton Posting – Augusta County Dead End
Most School Buses, Fire Trucks, and Ambulances Prohibited
Importance of Maintenance
Virginia’s Economic Competitiveness – Bridge Aesthetics

• Visitors’ lasting impression of Virginia is usually from the roads and bridges
• VA tourism generates $25 billion in visitor spending, supports 232,000 jobs, and generate $1.7 billion in state and local taxes (Virginia Tourism Corporation)
Importance of Maintenance
Virginia’s Competitiveness - Attracting Autonomous Vehicles

- Nationwide competition to attract autonomous vehicles
- Autonomous vehicle companies have stated clearly that their primary needs are:
  - Good pavement
  - Good bridges
  - Good striping
Today’s Discussion

• **Nationwide trends**
  • Aging inventory, increasing VMT and truck loads
  • Well rounded preventive maintenance program imperative

• **Virginia’s inventory size**
  • Federal measures – small portion
  • Statewide measures necessary

• **Long term focus and strategy**
  • Steps today will be realized by future generations
  • Using limited resources for best ROI
## Next Steps/Schedule

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<thead>
<tr>
<th>CTB Meeting</th>
<th>Description</th>
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<tbody>
<tr>
<td>June – Today</td>
<td>Present current state of the practice</td>
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<tr>
<td>July</td>
<td>Present proposed targets – statewide and federal</td>
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<td>Present overview of Special Structures</td>
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<tr>
<td>September</td>
<td>Request adoption from CTB of targets</td>
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<tr>
<td>Future meetings</td>
<td>Continued conversation of performance and investment opportunities</td>
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PAVEMENT AND BRIDGE OVERVIEW